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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/531,300

04/14/2005

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01/19/2006

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EXAMINER

CHOI, WILLIAM C

ART UNIT

PAPER NUMBER

2873

DATE MAILED: 01/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/531,300

Applicant(s)

BIGMAN, JOEL

Examiner

William C. Choi

Art Unit

2873

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14, 19-29, 57, 74, 76, 92, 94 and 109 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 109 is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-14, 22-29, 57 and 74 is/are rejected.
- 7) ☒ Claim(s) 4-7, 19-21, 76, 92 and 94 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. <u>0106</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.   |

## **DETAILED ACTION**

### ***Examiner's Comment***

The indicated allowability of the application, as discussed in the interview of January 6, 2006, is withdrawn in view of the newly discovered reference(s) to Hiramatsu et al (U.S. 5,311,350). Rejections based on the newly cited reference(s) follow.

### ***Claim Objections***

Claims 76, 92 and 94 are objected to because of the following informalities: in claim 76, line 8, "n<sub>2</sub> is" should be changed to "n<sub>2</sub>, is"; in claim 92, line 4, "n<sub>2</sub> is" should be changed to "n<sub>2</sub>, is"; in claim 94, line 4, "layer" should be changed to "layers". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 24, 25, 27 and 74 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, applicant discloses wherein said optical layer is transparent in or along specific planes or axes (i.e. x;z plane, y axis), but does not specifically disclose a frame of reference for said planes or

axes, thereby rendering the claims vague and indefinite. For purposes of examination, arbitrary planes or axes were assumed.

Claim 74 recites the limitation "between **said portion** and the remainder of the optical layer" in line 11. There is insufficient antecedent basis for this limitation in the claim. For purposes of examination, it was assumed that applicant meant to disclose in line 8, "arranged over **a portion of** said optical layer" as is similarly disclosed in claim 29.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 8-14, 22-29 and 57 are rejected under 35 U.S.C. 102(b) as being anticipated by Hiramatsu et al.

In regard to claim 1, Hiramatsu et al discloses an optical device (column 4, lines 9-36, Figure 1), comprising: a first conductive layer (column 4, lines 16-18, Figure 1, "22"); an optical layer, arranged over said first conductive layer (column 4, lines 13-16, Figure 1, "1"), said optical layer being transparent to at least a wavelength of interest and having an index of refraction (column 4, lines 28-36), which is a function of a variable, substantially reversible, dopant (i.e. ion) concentration in said optical layer (column 1, lines 53-56 & column 4, lines 28-36); and a second conductive layer,

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arranged over a portion of said optical layer (column 4, lines 16-18, Figure 1, "21"), inherently in accordance with a predetermined pattern, this being reasonably assumed from the broad usage of "pattern".

Regarding claim 2, a change in said index of refraction of said optical layer, due to a change in said dopant concentration, would inherently lead to a change in light absorption of said wavelength of interest within said optical layer, which is less than substantially 10%, this being reasonably assumed since Hiramatsu et al discloses wherein the range of light absorption ranges from optical transmittance to total reflection (column 4, lines 30-34) and applicant's disclosure of "change in said index of refraction" can encompass any change to achieve less than 10%, which is within the range disclosed by Hiramatsu et al.

Regarding claim 3, Hiramatsu et al discloses at least one power source, in communication with said first and second conductive layers (column 4, lines 21-23).

Regarding claims 8-14, applicant merely recites a recitation of the intended use of the claimed invention (i.e. "operative to/as"), which does not result in a structural difference between the claimed invention and the prior art, therefore not patentably distinguishing the claimed invention from the prior art. Since the prior art structure is capable of performing the intended use, it meets the claim.

Regarding claim 22, Hiramatsu et al discloses wherein said optical layer is formed of a polymer (column 4, lines 58-61).

Regarding claim 23, Hiramatsu et al discloses wherein said optical layer is transparent in a visible range of 400-800 nm (column 5, lines 45-47).

Regarding claim 24, Hiramatsu et al discloses wherein said optical layer is transparent in the x;z plane (Figure 2).

Regarding claim 25, Hiramatsu et al discloses wherein said optical layer is transparent along the y axis (Figure 2).

Regarding claim 26, Hiramatsu et al discloses wherein said device is transparent in a visible range of 400-800 nm (column 5, lines 45-47).

Regarding claim 27, Hiramatsu et al discloses wherein said device is transparent in the x;z plane (Figure 2).

Regarding claim 28, Hiramatsu et al discloses wherein said device is transparent along the y-axis, perpendicular to said layers (Figure 2).

In regard to claim 29, Hiramatsu et al discloses a method comprising providing an optical device (column 4, lines 9-36, Figure 1), which comprises: a first conductive layer (column 4, lines 16-18, Figure 1, "22"); an optical layer, arranged over said first conductive layer (column 4, lines 13-16, Figure 1, "1"), said optical layer being transparent to at least a wavelength of interest and having an index of refraction (column 4, lines 28-36), which is a function of a dopant (i.e. ion) concentration in said optical layer (column 1, lines 53-56 & column 4, lines 28-36); and a second conductive layer, arranged over a portion of said optical layer (column 4, lines 16-18, Figure 1, "21"), inherently in accordance with a predetermined pattern, this being reasonably assumed from the broad usage of "pattern"; and applying an electric potential between said first and second conductive layers, thus causing a reversible change in said index of refraction within said optical layer between said portion and the remainder of said

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optical layer (column 4, lines 24-36), inherently forming and selectively erasing an optical feature, this being reasonably assumed from the disclosure of changes from optical transmittance to total reflection (column 4, lines 30-34).

In regard to claim 57, Hiramatsu et al discloses an optical device (column 4, lines 9-36, Figure 1), comprising: a first conductive layer (column 4, lines 16-18, Figure 1, "22"); an optical layer, arranged over said first conductive layer (column 4, lines 13-16, Figure 1, "1"), said optical layer being transparent to at least a wavelength of interest and having an index of refraction (column 4, lines 28-36), which is a function of a variable, substantially reversible, dopant (i.e. ion) concentration in said optical layer (column 1, lines 53-56 & column 4, lines 28-36); and a second conductive layer, arranged over said optical layer (column 4, lines 16-18, Figure 1, "21"), wherein a change in said index of refraction of said optical layer, due to a change in said dopant concentration, would inherently lead to a change in light absorption of said wavelength of interest within said optical layer, which is less than substantially 10%, this being reasonably assumed since Hiramatsu et al discloses wherein the range of light absorption ranges from optical transmittance to total reflection (column 4, lines 30-34) and applicant's disclosure of "change in said index of refraction" can encompass any change to achieve less than 10%, which is within the range disclosed by Hiramatsu et al.

***Allowable Subject Matter***

Claim 109 is allowed.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claim 109: a method of producing a tunable optical filter comprising stacking optical layers as claimed, specifically wherein said optical layers have an index of refraction, which is a function of a variable, substantially reversible, dopant concentration gradient in said optical layers.

Claim 74 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claim 74: a method of selectively forming and erasing an optical feature comprising providing an optical device, which comprises a conductive layer arranged over a portion of an optical layer as claimed, specifically comprising applying an electric potential between first and second conductive layers, causing a reversible change in said optical layer refractive index between said portion and the remainder of said optical layer.

Claims 76, 92 and 94 would be allowable if rewritten or amended to overcome the objections set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claim 76: a tunable optical filter comprising alternate strata of indices of refraction of



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$n_1$  and  $n_2$  being substantially different from each other as claimed, specifically wherein at least one tunable index of refraction, selected from the group consisting of  $n_1$ ,  $n_2$ , and both  $n_1$  and  $n_2$  is a function of a variable, substantially reversible, dopant concentration of its associated stratum.

The prior art fails to teach a combination of all the claimed features as presented in claim 92: a method of producing a tunable optical filter comprising arranging alternate strata of indices of refraction of  $n_1$  and  $n_2$  being substantially different from each other as claimed, specifically wherein at least one tunable index of refraction of refraction, selected from the group consisting of  $n_1$ ,  $n_2$ , and both  $n_1$  and  $n_2$  is a function of a variable, substantially reversible, dopant concentration of its associated stratum.

The prior art fails to teach a combination of all the claimed features as presented in claim 94: a tunable optical filter comprising a stack of optical layers as claimed, specifically wherein said optical layers have an index of refraction, which is a function of a variable, substantially reversible, dopant concentration gradient in said optical layers.

Claims 4-7 and 19-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: The prior art fails to teach a combination of all the claimed features as presented in claim 4: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as claimed, specifically wherein said at least one power source includes at least two power

sources, for selectively applying power to different segments of said second conductive layer.

The prior art fails to teach a combination of all the claimed features as presented in claim 5: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as claimed, specifically further including a control unit and electrical switches for selectively applying power to different segments of said second conductive layer.

The prior art fails to teach a combination of all the claimed features as presented in claim 6: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as claimed, specifically wherein said optical layer has an initial uniform concentration of a dopant, and the application of an electric potential causes a substantially reversible gradient in dopant concentration to be formed.

The prior art fails to teach a combination of all the claimed features as presented in claim 7: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as claimed, specifically wherein an electrolyte layer is sandwiched between said optical layer and an ion-storage layer, respectively operative as first and second electrodes in a chemical cell.

The prior art fails to teach a combination of all the claimed features as presented in claim 19: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as

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claimed, specifically wherein said optical layer is formed of a material selected from the claimed group.

The prior art fails to teach a combination of all the claimed features as presented in claim 20: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as claimed, specifically wherein said optical layer is formed of silver doped  $\text{RbAg}_4\text{I}_5$ .

The prior art fails to teach a combination of all the claimed features as presented in claim 21: an optical device comprising an optical layer having an index of refraction, which is a function of a variable, substantially reversible, dopant concentration as claimed, specifically wherein said optical layer is formed of a material selected from the group consisting of silicon and a silicon compound.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William C. Choi whose telephone number is (571) 272-2324. The examiner can normally be reached on Monday-Friday from about 9:00 am to 6 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Mack can be reached on (571) 272-2333. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

*W.C.*  
William Choi  
Patent Examiner  
Art Unit 2873  
January 10, 2006

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